

# Next Generation Science Standards



- an overview of conceptual shifts and coordinated implementation

# Illinois and NGSS:

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- ◎ Illinois is among the 26 lead states to have worked collaboratively to update the standards
- ◎ NGSS was adopted by the Illinois State Board of Education on February 19, 2014
- ◎ The standards will go into effect in the state of Illinois beginning in the 2016-17 school year.

# What defines the NGSS:

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- ⦿ Designed to lead a coherent understanding of the Practices, Crosscutting Concepts, and Disciplinary Core Ideas
- ⦿ Performance expectations focused on the three dimensions of science learning
- ⦿ Coherent investigation of core ideas across multiple years of school
- ⦿ Seamless blending of practices with core ideas and crosscutting concepts

# Categories of Learning Goals/ Student Performance Indicators:

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- ◎ 8 Science and Engineering Practices
- ◎ 7 Crosscutting Concepts
- ◎ 43 Disciplinary Core Ideas

# Science and Engineering Practices:

1. Asking questions (for science) and defining problems (for engineering)
2. Developing and using models
3. Planning and carrying out investigations
4. Analyzing and interpreting data
5. Using mathematics and computational thinking
6. Construction explanations (for science) and designing solutions (for engineering)
7. Engaging in argument from evidence
8. Obtaining, evaluating, and communicating information

# Crosscutting Concepts:

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1. Patterns
2. Cause and effect: Mechanism and explanation
3. Scale, proportion, and quantity
4. Systems and system models
5. Energy and matter: Flows, cycles, and conservation
6. Structure and function
7. Stability and change

# Disciplinary Core Ideas:

Life Science	Physical Science
<p><u>LS1</u>: From Molecules to Organisms: Structures and Processes</p> <p><u>LS2</u>: Ecosystems: Interactions, Energy and Dynamics</p> <p><u>LS3</u>: Heredity: Inheritance and Variation of Traits</p> <p><u>LS4</u>: Biological Evolution: Unity and Diversity</p>	<p><u>PS1</u>: Matter and Its Interactions</p> <p><u>PS2</u>: Motion and Stability: Forces and Interactions</p> <p><u>PS3</u>: Energy</p> <p><u>PS4</u>: Waves and their Applications in Technologies for Information Transfer</p>
Earth and Space Science	Engineering and Technology
<p>ESS1: Earth's Place in the Universe</p> <p>ESS2: Earth's Systems</p> <p>ESS3: Earth and Human Activity</p>	<p>ETS1: Engineering Design</p>

# The three components are all inter-related :

- ◎ For students to be successful, they will need instruction consistent with the three dimensions integrated in the performance expectation and assessment
- ◎ <http://www.nextgenscience.org/kps2-motion-stability-forces-interactions>





# Conceptual Shifts in the Next Generation Science Standards:

1. K-12 science education should reflect the interconnected nature of science as it is practiced and experienced in the real world
2. The Next Generation Science Standards are student performance expectations- NOT curriculum
3. The science concepts in the NGSS build coherently from K-12
4. The NGSS focus on deeper understanding of content as well as application of content
5. Science and engineering are integrated in the NGSS, from K-12
6. The NGSS are designed to prepare students for college, career, and citizenship
7. The NGSS and Common Core State Standards (English Language Arts and Mathematics) are aligned

# Steps to Implementation:

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1. Develop an awareness of the Next Generation Science Standards
2. Understand the nature of NGSS and the curriculum, teaching, and paradigm shifts required for successful implementation
3. Self-assess strengths and areas of need; are there changes that need to take place for successful implementation?

# Implementation: The Next Steps

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4. Create model lessons for implementation:
  - ❖ Modify curriculum organization
  - ❖ Develop, modify, and secure new instructional material
  - ❖ Try new instructional strategies
  - ❖ Integrate the three dimensions of NGSS
  - ❖ Draft and pilot lessons

# Final Steps of Implementation:

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5. Plan units of instruction including implementation activities and formative assessments to monitor students' progress
  - ❖ Secure funding needed for implementation and make necessary purchases
6. Create professional development surrounding units of instruction
7. Proceed with implementation

# Questions?

